# *Flight Critical Data Integrity Assurance for Ground-based COTS Components*

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With powerful information management and communication tools, flight data and maintenance records can be easily collected, analyzed, and disseminated for aircraft management and maintenance. This presents an opportunity for cost and efficiency optimization. The opportunity can be realized only when the whole process can be made trustworthy and secure.

Arizona State University (ASU) and United Technologies Research Center (UTRC) are conducting a research project to investigate the issues of making the Commercial-Off-The-Shelf (COTS) ground processing system for aircraft maintenance trustworthy and secure. The research will be carried out in three directions: information and data protection, access security, and safety critical aspects of COTS ground systems. The application of data protection and authentication approaches in other industries, such as e-Business, will be studied and their limitations and strengths will be identified. In addition we will identify safety requirements and appropriate processes and objectives associated with data integrity in ground-based COTS systems for existing maintenance procedures and future condition-based management procedures. UTC's Sikorsky, Hamilton Sundstrand and Pratt and Whitney divisions each have products and processes for handling avionics data. Engine or Aircraft maintenance systems, Health and Usage Monitoring System (HUMS), and the associated system components will be the basis for this investigation which will focus on effectively protecting safety critical data from abnormal operation of ground-based COTS components.

The project will also include the development of a representative demonstration system. A process for protection and authentication of ground-based systems, operating on avionics data, will be proposed. Techniques for effective protection of HUMS systems and flight critical data from abnormal operation of ground-based software and hardware will be demonstrated. During the development of this demonstration system, the objectives for data integrity will be evaluated relative to their effectiveness in achieving airworthiness in critical systems.